Green Schools News

EmPOWERing Maine Students to Know Their SOURCE

Winter 2004

Volume 4, Issue 2

Student Energy Project Offers $$ Saving Opportunity

MBMS student, Amos Doughty collects data for his "science fair Vending Miser" research project

Would you like to find a way in which your school could save money while helping to conserve energy? If you answered yes, a "Vending Miser" or "Snack Miser" might just be up your alley.

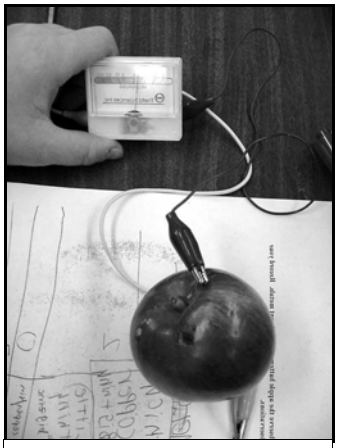
In April, 2003, Amos Doughty from Mt. Blue Middle School (MBMS) in Farmington performed an experiment with a "Vending Miser" over a week long period for a science fair project. His topic was "to determine how much energy the "Vending Miser" occupancy sensor control could save on the school's vending machines and how long it would take for it to pay for itself."

Research performed on the "Vending Miser" shows that a savings between 24 and 76 percent is likely. Amos hypothesized a 50 percent savings in energy costs for the vending machine with a 2.4 year payback period for the "Miser". His results: an energy savings

Continued on page 2

Students Get Energized During MEEPs Fall Energy Education Leadership Workshops

Wow! 466 students and teachers attended the six regional energy education leadership workshops during the fall of 2003. Playing various educational games and fun hands-on activities, students and teachers alike learned about energy consumption, the different sources of energy, how electricity is produced, and how they can help conserve energy. The following fun yet educational activities were sampled during the workshops:



The ever-popular Apple Battery activity is one your students are sure to enjoy!

In **our Energy Icebreaker,** students interact with each other and learn about the energy consumption habits of themselves and their fellow students. What does "BTU" have to do with energy? Listening to the Palmer Putnam Rap, students ponder how much energy has been used throughout history.

Continued on page 3

Green Schools News is a publication of:

Maine Energy Education Program (MEEP) and the Maine Department of Environmental Protection, Air Bureau (MDEP)

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What Can The Green Schools Program Do For You?

- Encourage Interdisciplinary Learning and Environmental Awareness.
- Foster better communication between students, teachers, custodians and administrators.
- Help your school save electricity, which results in more money for books and classroom supplies.

IN THIS ISSUE:

Upcoming Spring Events!

Tuesday February 24—Start looking for the first signs of spring as Jeepers Peepers starts it's fifth year.

Saturday March 13, 10 a.m. to 3 p.m. —free teacher workshop on building solar cars at the Owls Head Transportation Museum in Rockland.

Tuesday, March 23—Jeepers Peepers 2004! essay deadline. Please have your entries postmarked no later than this date. For more information on Jeepers Peepers 2004!, please visit www.mainedep.com.

Saturday, June 5—State finals for the Junior Solar Sprint Competition at the Owls Head Transportation Museum in Rockland.

Vending Miser (cont.)

of 49 percent and a 1.8 year payback. The actual savings for the vending machine at MBMS was 98 dollars per year, based on a 40 week per year operation.

A great asset for your school to invest in? "Yes" said Amos. Unfortunately, due to budgetary restrictions, Amos was unable to present his findings to the school board. He does suggest that other kids at other Maine schools try the experiment for themselves. When asked why it is important to use such machines to cut down on energy consumption, Amos simply answered "energy isn't unlimited."

So what exactly is a "Vending Miser"? According to www.bayviewtech.com, a "Vending Miser" is an instrument which "powers down" a vending machine when it is not in use. Using an infrared sensor, the "Vending Miser" turns down the energy consumption of a machine when the area around the machine, approximately a 15-foot radius, has been unoccupied for 15 minutes. When someone enters the radius, the "Vending Miser" turns on the machine. The "Snack Miser" is also available for snack machines.

Such a device is ideal for schools or businesses which do not have a continuous operating schedule or when a building is not operating for extended periods of time. Your students can conduct this experiment to predict the energy savings for you school. MEEP and MDEP have teamed up to demonstrate the equipment and to encourage students to participate in the Vending Miser Challenge.

To find out more about the Vending Miser Challenge, please see the teacher insert on page four or contact Peter Zack at 207-625-7833 or Debbie Avalone-King at 207-287-7028.

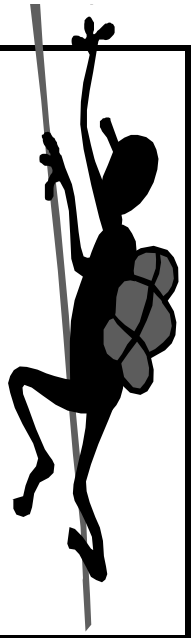
Borrow a Climate Change Backpack Today!

A Climate Change Backpack

The Department of Environmental Protection is still offering the Climate Change Backpack. It is literally a backpack filled with hands-on curriculum ideas, games and activities to use in the classroom and outside on the trail. It's designed to be portable, and most of the materials are water proof. We're even willing to come in and do a few of the activities with your class!

At your request, we can include a copy of "**Teaching About Climate Change: Cool Schools Tackle Global Warming,**" a new publication by Green Teacher. This book is a great resource for getting students involved in learning about this important topic.

To borrow a backpack or for more information, call: Jeremy Dubois at 207-287-4855 or Peter Zack at 207-625-7833.



Looking For A Project That Engages Your Students, Helps Them Utilize Their Science Process Skills, And Teaches Them Valuable Lifelong Habits?

Look no further! We have the perfect solution: **MEEP-sponsored Energy Patrols**. We believe our Energy Patrols are an excellent year-long project for your students, for several reasons.

First and foremost, it involves the children in activities that require them to use their science and math skills to help solve a real-life problem (namely, the overuse of electricity in this country).

Second, the project helps the students become more aware of their energy consumption habits—a useful life skill that not only saves the school much needed money, but also contributes to the reduction of air pollution and helps minimize the effects of Global Climate Change.

Students at Village School in Gorham practice light metering skills.

Third, the project can be easily adapted to meet state and national standards in math and science (always a plus). Finally, it is a project that has the potential to reap maximum rewards with minimal input, for it requires only a few minutes of the children's time each day.

"What's involved in an Energy Patrol?", you ask. Good question! Our Energy Patrol trainings are split into two visits.

On our first visit, we'll introduce our "awareness" activities. These activities are designed to introduce your students to the concept of what electricity is, different ways in which it can be generated, the pat-tern of energy use over human history, and reasons for the need to conserve energy.

Continued on page 7

Jeepers Peepers 2004!

Welcome Spring with the fifth year of **Jeepers Peepers Spring Watch!** You and your class can have fun tracking and reporting the progress of Spring in Maine with other classes around the state. Or, you can enter your class in the JP Essay Contest on Climate Change.

For more information and links to supplemental activities and information on this year's essay contest, please visit the Jeepers Peepers 2004! website at:

Fall Workshops (cont.)

Taking Sides in **The Great Energy Debate,** students present the pros and cons of renewable resources vs. nonrenewable resources. Do you have any preconceptions as to which type of energy sources are better?

In the electrifying **Apple Battery Experiment**, students learn about electricity and get to make it themselves using a piece of fruit! Hypotheses are tested and data is collected as students become scientists while producing electricity with an apple.

In the energizing **Photovoltaic (PV) Cell Activity,** students practice with solar panels to make a mini-fan spin! Students view first hand that electricity can be produced by trapping the sun's energy.

Reading an **Electric Meter** is an acquired skill. Do you know how to read one? Possessing this skill allows students to read their school's and home's electric meter and allows them to see first hand how their energy conserving habits are paying off.

For older students, **The Global Energy Game** simulates adult challenges in making energy choices in the real world. Students represent the voting population of a fictional island nation as they try to balance environmental, economical, and energy-use consequences when faced with difficult, yet real life choices.

Kids love competing in **Energy Jeopardy**, an informative and fun way in which they learn about energy through categories such as "fossil fuels", "renewables", and "energy conservation" in the same answer-question format as the television show.

One student who attended the Brunswick Workshop thought "The entire workshop was fun – good job! I especially enjoyed the debate – it was fun and informative." Similarly, a teacher from the Augusta workshop commented "I love kids getting involved in talking, exploring and becoming more aware about energy – great opportunity to become more aware and engaged in these concepts."

To find out more or to schedule presentations in your classroom, please contact MEEP at 207-625-7833.

THE VENDING MI$ER/SNACK MI$ER CHALLENGE

A SCHOOL ENERGY EFFICIENCY PROJECT

Your challenge, should you choose to accept it, is to identify two vending machines in your school that are potential Energy Hogs.

You will need to conduct a scientific assessment comparing electricity use before and after installation of the *Vending Mi$R*, then create a report.

GOAL #1: To document how much energy may be wasted in your school by inefficient vending machines.
GOAL #2: To prepare a report documenting your findings and provide a copy to MEEP/DEP to be used for news articles and informational purposes.

GOAL #3: To provide a copy of your report to school officials to encourage them to invest in purchasing *Mi-$ers* and thereby reduce your school's electricity bill each year by $_____. (Your research will provide this $ prediction.)

(You can access the Efficiency Maine website to download a form to receive a $50 rebate for each Mi$er your school decides to purchase before. Look for the link @ http://www.efficiencymaine.com/school_efficiency_program.htm)

Anticipated experiment time: ~3 weeks with daily 5-10 minute - equipment checks after initial installation time of about 1 hour. Analysis of results and writing of report could take a couple of hours.

The "Vending Mi$er" Experimental Procedure

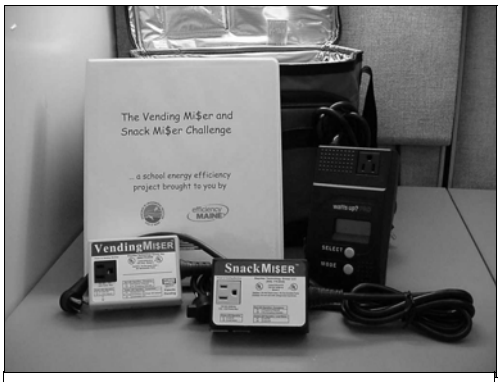
1. **The Experimental Protocol is to**
   - A. Install a WATT METER to measure the daily kWhs used by each machine.
   - B. Record on a chart, the kWhs used daily (24 hours).
   - C. Calculate the Avg. daily kWh used then estimate the total electricity that would be used over a year.

2. **Next, install the Vending Mi$er** (for a refrigerated unit) **and/or the Snack Mi$er** (for a snack unit)

Then you can again measure and record daily the amount of electricity used and repeat your calculations.

3. **Then finally, you will analyze your data and compare the *difference*** before and after the installation of the *Mi$er*. You must obtain the amount your schools is paying for it's electrical service.

4. **Using the calculations chart on the following page, see if you can predict how much energy you could save if you installed a Mi$er.**



"Vending Mi$er Challenge" Kit
(Available for loan upon request.)

We think you will be amazed at how much energy savings you will find! Please write your report and then return the equipment to us as soon as possible so another school can complete the Challenge. Let us know how you approached your school managers and whether they've agreed to purchase these worthwhile energy efficiency products.

TO BORROW THE VENDING Mi$ER CHALLENGE KIT, Contact Peter Zack or Deb Avalone-King . Peter can be reached at 207-625-7833 or meep@psouth.net; debbie.j.avalone-king@maine.gov or 207-287-7028.

How much can you save by installing a Snack Mi$er or Vending Mi$er?

Vending Machine (refrigerated):

Electricity cost per kWh	
Hours machine runs per week	168
Typical power requirement (avg. watts used per hour)	400

Snack Machine:

Electricity cost per kWh	
Hours machine runs per week	168
Typical power requirement (avg. watts used per hour)	80

How much do you currently spend on your refrigerated vending machines?

- Cost per machine per week = hrs per week machine runs x power requirement per machine/1000 (to convert Watts to Kilowatts) x Electricity cost (kWh).

  $_____ = _____ hrs/week x _____ power requirement/1000 x _____ $/kWh

- Yearly cost = Cost per machine x 52 weeks

  $_____ = $_____ x 52 weeks

- Total Energy Cost = Yearly energy cost per vending machine x total number of vending machines.

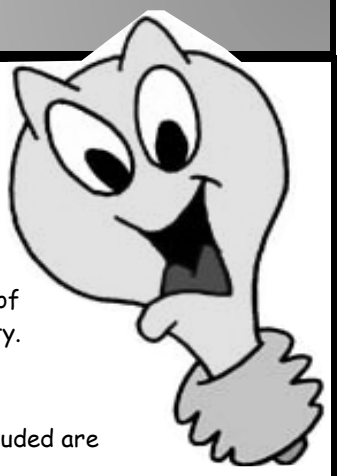
  $_____= $_____ x _____ # of vending refrigerated machines

Next, repeat these same calculations for all **snack machines** at your school. Finally, figure the total cost of electricity that is used by all machines at your school by adding the electricity cost of the refrigerated vending machines with that of the snack machines.

Various studies have shown a potential energy savings of around 50 percent per machine. How much could your school save if you reduced your energy demand by 50 percent?

We can loan you a **Vending Mi$er Challenge Kit** to test your hypothesis. Also, MEEP and MDEP will gladly come into your school to demonstrate how to use a Mi$er and to help you begin your experiment.

"Watts" on the Web?



- http://www.maine.gov/dep/air/education/blueskies.htm
  Take a quiz, email a question, or download air quality related material and activities that will help you engage your students in learning about air quality issues and its connections to energy.

- http://www.katyc.org/tripplanning.htm.
  Kids and Transportation of York County offers in depth information on different modes of transportation, as well as links to teacher activities including the car free vacation activity.

- http://www.eia.doe.gov/kids/
  Energy Ant will guide you through the Energy Information Administration kid's page. Included are many kid friendly activities as well as links to useful materials for teaching about energy.

- http://www.energyquest.ca.gov/transportation/index.html
  A list of useful information on alternative fuel vehicles is given on this website including games and science projects for students.

Mt. Blue High School Wins the Connecticut Electrathon Challenge!

Mt. Blue High School's three person team outdistanced approximately twenty other cars by five to ten laps in this past fall's Connecticut Electrathon Challenge, a biannual electric car race that takes place in Lime Rock, Connecticut. According to driver Angela Ferrari, the track, which is about a third of a mile long and shaped like the letter "B", is quite challenging because it has lots of hills and sharp turns.

Angela was pleasantly surprised by her team's win, because the car she drove has a simpler design than many of the other competing cars.

Ready, set, go! Electrathon vehicles on their way to successful races.

Mt. Blue High School is distinguished in the Electrathon community for several reasons, most notable of which is that it has participated in Electrathon events across the nation for the past ten years—a significantly longer time period than most other teams. Additionally, Mount Blue is the current high school record holder for distance in an Electrathon event (43.15 miles in one hour).

Open to people of high school age or older, Electrathon events provide adolescents and adults an opportunity to design, build, and race electric cars on professional race tracks all over the country. Of course, in the name of safety, strict guidelines must be followed when building and racing Electrathon cars. For example, each car can only carry sixty-four pounds of batteries (this is equivalent to two car batteries), and these batteries can only provide one horsepower of energy to the car's electric motor.

Although the cars are capable of reaching speeds of 70 miles per hour, motors are geared down so that cars don't travel more than 30 miles per hour or so (Angela's top speed during the race this fall was approximately 27 miles per hour). Additionally, each car must carry exactly 180 pounds of ballast, which includes the weight of the driver. Interestingly, when the ballast for Mt. Blue High's car was weighed just prior to this fall's race in Connecticut, it was determined that the team was 2 pounds short of the 180-pound goal. Where did the team get the extra two pounds? Angela's calculus book! (See? Calculus DOES have a practical use.)

Intrigued? Each spring Electrathon America holds a race in Maine. In past years, the race has been held at the Beech Ridge Speedway in Scarborough, but this year the organization would like to hold the race at the Oxford Plains Speedway in Oxford. Check Electrathon America's website (http://www.electrathonamerica.org) for the date and location of this year's race. We hope to see you there!

New Alternative Fuels Debate Game Now Available!

Is Ethanol A Better Alternative Fuel Choice Than Biodiesel? Hmmm…that's a tough choice. On the one hand, ethanol is a cleaner burning fuel, but it needs to be mixed with gasoline, and if the ethanol content is greater than 10 percent, then the car must be converted in order to burn ethanol as a fuel. Additionally, ethanol is most readily available in the midwest, where the source of the fuel is grown.

A student at Greene Central School defends his position in a debate.

On the other hand, biodiesel is not as clean burning as ethanol, it can be made anywhere in the country, however it needs to be mixed with diesel fuel in cold weather because biodiesel congeals at low temperatures. Diesel-burning cars can be easily converted to run on biodiesel, and…all that's required is replacing a few hoses.

Still unsure? Perhaps you need some more information about ethanol and biodiesel in order to help you make your decision. Why not try our new ALTERNATIVE FUELS DEBATE GAME?

Developed by MEEP's national affiliate, the NEED Project, the ALTERNATIVE FUELS DEBATE activity focuses on the chemical properties, energy content, associated costs, and relevant characteristics of several types of fuels, including petroleum, propane, ethanol, liquid natural gas, electricity, biodiesel, methanol, and hydrogen. Call Peter today at 207-625-7833, to arrange for a MEEP staff member to introduce this activity to you and your students!

Have you ever seen a "Grease Car"?

Students at our fall Transportation and the Environment Workshops got a close up look at a grease car that runs on recycled filtered grease from a local Thai restaurant. The big difference is a conversion unit. DEP's Peter Cooke has retrofitted his own car which converts ordinary, used kitchen grease found in restaurants or one's own home into a useful, usable fuel. In fact, any diesel-powered vehicle can be equipped to run solely on grease or a combination of grease and diesel. What's especially interesting is that the exhaust smells like french fries!

In two activities offered by the Greater Portland Council of Governments and Kids and Transportation of York and Cumberland Counties, students got to experience real life scenarios when it came to transportation choices. Students in grades nine through twelve participated in the Consumer Game headed by Erik Hermann. They were given a consumer profile and then asked to choose a car based on that profile. Profiles contained budget, family situation, and primary use for the vehicle. Several alternative fuel vehicles and public transportation were offered as options, along with consumer reports that emphasized the real world situation.

Students discuss real life choices during the Global Energy Game.

Dave Carpenter of Kids and Transportation of York County collaborated with Erik Herman to develop the Car Free Vacation activity which offered students in grades six through eight a transportation planning experience. Students were given a scenario which described a number of various activities available with a set amount of time and money to complete any set of activities. Decisions were based on their personal interests. The activity effectively introduced kids to concepts such as time and money management, as well as map interpretation. Like the Consumer Game, Carpenter stated, "kids got to think about different modes of transportation and were able to see that there are different reasons why people choose different types of transportation."

Many diesel vehicles can be converted without voiding your warranty, like this VW.

Students also engaged in discussions around an interesting and informative PowerPoint presentation on the history of transportation. The Global Energy Game was played which provides an emphasis on transportation (see the fall workshop article for more information on the game). Students also played Transportation and the Environment Jeopardy. This fun quiz activity put to the test what kids learned throughout the day's activities.

For more information on the Car Free Vacation, check out the links in the "Watt's Up Section" of our newsletter. For information on any of the other activities and getting MEEP staff to visit your classroom, please contact MEEP at 207-625-7833.

Energy Patrols (cont.)

Our second visit is devoted to providing your students with specific skills they will need in order to help your school save energy (a.k.a. our "skills building" activities). During this session, your students will learn to read a light meter and discover how to read an electric meter and compute monthly electricity cost.

Additionally, the students will learn how to identify energy "hogging" appliances by scanning their electric nameplates.

Our second visit will culminate in training eight of your students to do an Energy Patrol and to help introduce your energy conservation project to the rest of the school.

To date, MEEP has trained Energy Patrols in more than 30 Maine schools. Clear reductions in electricity consumption have been realized by those schools able to sustain an energy patrol effort for at least several months. For example, one school in the Augusta area was able to reduce its electricity consumption by 560 kilowatt-hours per month over the five month period its patrol was in effect, resulting in an average monthly savings of more than 70 dollars assuming a 13 cent per kilo-watt hour rate. Another in the Hartland area saved 280 kilowatt-hours of electricity per month over the four month period its patrol was in effect resulting in a savings of over 35 dollars a month.

Do you think your school could do better? **Call Peter Zack at 625-7833** today to schedule an Energy Patrol training for your students!

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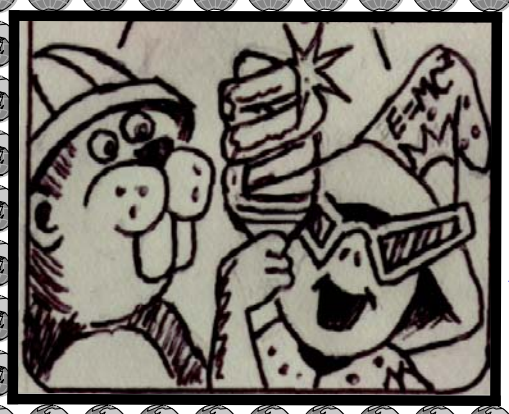

Hey, what's this?

They're MEEP's compact fluorescent light bulbs. Why not call & find out how you can get some of these for your school and faith community fundraisers—only $3.50 each!

Check out our website at www.meepnews.org

The Maine Energy Education Program Thanks Our Generous Sponsors:

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